application notes

HP StorageWorks LUN migration and persistence utilities 1.1

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HP StorageWorks LUN migration and persistence utilities 1.1

About this document

This document provides information about HP StorageWorks LUN migration and persistence utilities, including:

- Release notes information
- Intended audience
- Other documentation
- HP technical support

NOTE:

You can download the LUN migration and persistence utilities 1.1 for Linux at

http://h18006.www1.hp.com/products/sanworks/softwaredrivers/securepath/linuxutilities.html

Release notes information

This document describes the following:

- Migrating LUNs from Secure Path to the QLogic failover driver
  - Migration prerequisites
  - Supported hardware and software for LUN migration on 2.4 kernels
  - Installing the LUN migration utility
- Adding persistence to the QLogic driver
  - Prerequisites
  - Supported hardware and software for Linux 2.4 and 2.6 kernels
  - Installing the LUN persistence utility
  - Configuring HP storage devices for 2.4 kernels
  - Configuring HP storage devices for 2.6 kernels
- Data-In-Place (DIP) migration procedure for Linux hosts
  - Prerequisite and required documentation
  - Supported hardware and software for array upgrade
  - Installing the LUN migration and persistence utility for array upgrade on Linux 2.4 kernels
  - Installing LUN migration and persistence utility only for persistency on Linux 2.4 kernels
  - Installing LUN migration and persistence utility only for persistency on Linux 2.6 kernels
- Removing the migration and persistence utility
- Troubleshooting
- Limitations of the LUN Migration and Persistence Utilities

Intended audience

This document is intended for:

- Customers who are using Secure Path 3.0C or later for Linux® and wants to migrate to the QLogic failover driver.
- HP service-trained personnels who want to upgrade from EVA3000/5000 Active-Passive to EVA3000/5000 Active-Active, using Secure Path 3.0C or later for Linux® and wants to migrate to the QLogic failover driver.
- HP service-trained personnels who wants to upgrade from EVA3000/5000 arrays to EVA4000/6000/8000 arrays that is connected to the Linux host.

NOTE:

The HP LUN migration and persistence utility 1.1 is Linux errata (RHEL/SUSE) independent.

You can also use this document to perform selective upgrade of arrays.

Other documentation

Additional documentation that you may find helpful includes:

- *Using the QLogic driver for single-path or multi-path failover mode on Linux systems application notes*, part number AA-RVGWC-TE.
- QLogic failover driver documentation that came with your QLogic Host Bus Adapter (HBA) kit.
- White papers and best-practices documents are available at http://www.hp.com/country/us/eng/prodserv/storage.html

HP technical support

Telephone numbers for worldwide technical support are listed on the HP support web site: http://www.hp.com/support/

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP recommends that customers sign up on line using the Subscriber's choice web site: http://www.hp.com/go/e-updates

- Subscribing to this service provides you with e-mail updates on the latest product enhancements, newer versions of drivers, and firmware documentation updates as well as instant access to other product resources.
- After signing up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

Migrating LUNs from Secure Path to the QLogic failover driver

The logical unit number (LUN) migration utility is intended to migrate LUNs managed by Secure Path to the QLogic failover driver. This utility enables a smooth transition of devices from Secure Path and ensures that the applications using these devices do not require any configuration changes after removing Secure Path. This utility is qualified for migrating from Secure Path 3.0C or later.

△ CAUTION:

HP recommends that you to take a full backup of the Linux operating system and data volumes before starting the migration. HP shall not be responsible for any data loss during the migrating process.

📝 NOTE:

The `hpdevlabel` utility is used only for the LUN migration and persistence on Linux 2.4 kernels variants.

This section describes the following:

*   Migration prerequisites
*   Supported hardware and software for LUN migration on 2.4 kernels
*   Installing the LUN migration utility

Migration prerequisites

Verify the following before migrating LUNs from Secure Path to QLogic failover driver:

*   Ensure that all clustering software that you are using are supported by HP, and they also support the QLogic failover solution.
*   Do not change the SAN configuration during the LUN migration process.
*   Migrate only hosts connected to HP storage arrays and managed by Secure Path.
*   Stop all applications, including daemons, cron jobs, and cluster services, and unmount logical volumes that access the file system on the devices that you are migrating.
*   Identify any dependencies the Storage Area Network (SAN) and applications may have with Secure Path, such as persistent devices created by Secure Path.

Supported hardware and software for LUN migration on 2.4 kernels

Table 1 lists the supported hardware and software for LUN migration on Linux 2.4 kernels variants.

Table 1 Supported hardware and software

Host feature	Requirement
Operating systems	Red Hat Enterprise Linux 2.1 U7-smp ia32/ia64 Red Hat Enterprise Linux 2.1 U7-enterprise ia32 Red Hat Enterprise Linux 3.0 U5-hughmem ia32/ia64 Red Hat Enterprise Linux 3.0 U5-smp ia32 Red Hat Enterprise Linux 3.0 U6-hughmem ia32 Red Hat Enterprise Linux 3.0 U6-smp ia32/ia64 Red Hat Enterprise Linux 3.0 U7-hughmem ia32/ia64 Red Hat Enterprise Linux 3.0 U7-smp ia32 SUSE Linux Enterprise Server 8 UL 1.0 SP4 ia32/ia64
RAID systems	**Migration kit (Secure Path to Qlogic): 2.4 kernels only** EVA3000/5000 (fw rev 3.025/3.028) MSA1000 (fw rev 4.48)
Host Bus Adapters (HBAs)	FCA2214/FCA2214DC 2-Gb PCI-X A6826A (Driver 7.07.03-5 or later)

Installing the LUN migration utility

To install the HP LUN migration utility for Linux 2.4 kernels, complete the steps below:

1. Log on to the Linux system as a superuser (`root`).
2. Copy the `LMPutils.tar.gz` file to a temporary directory on your system.
3. Extract the `hpdevlabel` package by entering the following command:

   `# tar -zxvf LMPutils.tar.gz`
4. Run the `install.sh` script by entering the following commands:

   `# cd ./LMPutils`
   `# ./install.sh -i`
   Console output:

```
Welcome to the Linux Lun Migration and Lun Persistence installer
                    Version 1.1
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
~ 1 . Lun Migration with Lun Persistency ~
~ 2 . Lun Persistency Only (2.4 Linux Kernel) ~
~ 3 . Lun Persistency Only (2.6 Linux Kernel) ~
~ 4 . Exit ~
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Enter your Choice (1/2/3/4): 1

Lun Migration and Persistence utility Installed successfully

INSTALL QLOGIC DRIVER IN FAILOVER MODE,AND FOLLOW THE INSTRUCTIONS IN LUN
MIGRATION & PERSISTENCE UTILITY APPLICATION NOTES FOR MIGRATION AND
ARRAY UPGRADE PROCESS.
```

5. Run the following command to migrate from Secure Path to Qlogic failover driver:

   `# /opt/hp/hp-devlabel/premigration.sh`

6. Install the Qlogic driver in the failover mode and configure `qlogic` in the excludemodel mode for coexistence of Active-Passive and Active-Active array.

The variable `ql2xexcludemodel` in the `/etc/modprobe.conf` file excludes the device models from being a failover capable target. Combine one or more of the following model numbers into an exclusion mask:

```
0x20 - HSV111, HSV101
0x04 - HSV110, HSV100
```

> **NOTE:**
>
> These values are configured in the `/etc/modprobe.conf` file. For more details, see the install notes for Qlogic driver.

7. Reboot the system.

8. Run the following command to get the LUN status:

```
# hpdevlabel status
```

> **NOTE:**
>
> Installing the HP LUN migration utility creates the `/opt/hp/hp-devlabel` directory, where all the scripts needed for migration gets copied. It compiles the sources and copies the binaries and scripts into the system directories.
>
> All the migrated LUN information for persistence is maintained in the `/etc/sysconfig/hpdevlabel` directory. HP recommends that you do not edit this file.
>
> To know more about how to use the HP LUN migration and persistence utilities, see
>
> Configuring HP storage devices for 2.4 kernels.

> **IMPORTANT:**
>
> The HP LUN migration utility does not remove Secure Path; you need to remove Secure Path manually.

Adding persistence to the QLogic driver

Linux assigns small computer system interface (SCSI) device names dynamically whenever a SCSI logical unit is detected during device discovery. These device names such as `/dev/sda` and `/dev/sdb` are mapped to SCSI logical units and may vary across reboots due to any SAN changes. LUN persistence is the ability of the host to ensure that the devices maintain the same name for the SCSI logical units across reboot without getting affected due to the SAN changes. This is accomplished by maintaining the mapping of the device unique identifier with the desired device name in a database.

This section describes the following:

- Prerequisites
- Supported hardware and software for Linux 2.4 and 2.6 kernels
- Installing the LUN persistence utility
- Configuring HP storage devices for 2.4 kernels
- Configuring HP storage devices for 2.6 kernels
  - Creating rules for a device
  - Creating links for persistence
  - Removing persistence from a device or a LUN

Prerequisites

You must perform the following tasks before installing the HP LUN persistence utility for QLogic failover:

- Ensure that all clustering software is supported by HP and also support the QLogic failover solution.
- Stop all applications including daemons, cron jobs, and cluster services. Next, unmount the logical volumes that access the file system on the devices being persisted.

> **NOTE:**
>
> You need to change the configurations of the application to point to the new persistent device name after you have configured the actual device for persistence.

For 2.4 kernels:

Install the `partx` utility to have persistency for the device partitions.

For 2.6 kernels:

- Ensure that the QLogic driver is configured as a failover driver.
- Ensure that the `udev` utility has come bundled with all Linux 2.6 kernels.

> **NOTE:**
>
> If you do not have the latest `udev` utility running on your Linux 2.6, then download it from the following web site: http://www.us.kernel.org/pub/linux/utils/kernel/hotplug/

- Install the latest `hotplug` scripts.

  You can download the latest script from the following web site: http://www.us.kernel.org/pub/linux/utils/kernel/hotplug/
- Ensure that Linux 2.6 kernels are enabled with the kernels option `CONFIG_HOTPLUG`. This option is enabled on default Linux vendor kernels.
- Ensure that the `sysfs` file system is mounted.

Supported hardware and software for Linux 2.4 and 2.6 kernels

Table 2 lists the supported hardware and software for LUN persistence utility on Linux 2.4 and 2.6 kernels

Table 2 Supported hardware and software

Package and kernels version	Host feature	Requirement
`hpdevlabel` Linux kernels 2.4	Operating system	Red Hat Enterprise Linux 2.1 U7-smp ia32/ia64 Red Hat Enterprise Linux 2.1 U7-enterprise ia32/x86_64 Red Hat Enterprise Linux 3.0 U7-hughmem ia32/ia64 Red Hat Enterprise Linux 3.0 U7-smp ia32/x86_64 Red Hat Enterprise Linux 3.0 U6-hughmem ia32/x86_64 Red Hat Enterprise Linux 3.0 U6-smp ia32/ia64 Red Hat Enterprise Linux 3.0 U5-hughmem ia32/ia64/x86_64 Red Hat Enterprise Linux 3.0 U5-smp ia32/x86_64 SUSE Linux Enterprise Server 8 UL 1.0 SP4 ia32/ia64/x86_64
	RAID systems	**LUN persistence kit (Qlogic-FO only):** EVA3000/5000 3.x and 4.x EVA4000/6000/8000 MSA1000 VA7100/7110/7400/7410 XP128/1024/12000
`hpdevlabel` Linux kernels 2.4 and `hpudev-cfg` Linux kernels 2.6	HBAs	FCA2214/FCA2214DC 2-Gb PCI-X and A6826A Driver 7.07.03-5 or later for 2.4 kernels Driver 8.01.03-05 or later for 2.6 kernels
`hpudev-cfg` Linux kernels 2.6	Operating system	Red Hat Enterprise Linux 4 U2 ia32/ia64/x86_64 Red Hat Enterprise Linux4 U3 ia32/ia64/x86_64 SUSE Linux Enterprise Server 9 SP2 ia32/ia64/x86_64 SUSE Linux Enterprise Server 9 SP3 ia32/ia64/x86_64
	RAID systems	**LUN persistence kit (Qlogic-FO only):** EVA3000/5000 3.x and 4.x EVA4000/6000/8000 MSA1000 VA7100/7110/7400/7410 XP128/1024/12000

Installing the LUN persistence utility

You can install the HP LUN persistence utility on a Linux 2.4 kernels or on a Linux 2.6 kernels using the `hpdevlabel` or `hpudev-cfg` utility.

This section describes how to install the HP LUN persistence utility on the following configurations:

- Installing LUN persistence on Linux 2.4 kernels
- Installing LUN persistence on Linux 2.6 kernels

Installing LUN persistence on Linux 2.4 kernels

The `hpdevlabel` utility is used for the LUN persistence on Linux 2.4 kernels. To install the HP LUN persistence utility on your Linux 2.4 kernels, complete the steps below:

1. Log on to the Linux system as a superuser (`root`).
2. Copy the `LMPutils.tar.gz` file to a temporary directory on your system.
3. Extract the `hpdevlabel` package by entering the following command:

   ```
   # tar -zxvf LMPutils.tar.gz
   ```
4. Execute the `install.sh` script by entering the following commands:

   ```
   # cd ./LMPutils
   # ./install.sh -i
   ```

   Console output:

   ```
   Welcome to the Linux Lun Migration and Lun Persistence installer
      Version 1.1
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   ~ 1 . Lun Migration with Lun Persistency ~
   ~ 2 . Lun Persistency Only (2.4 Linux Kernel) ~
   ~ 3 . Lun Persistency Only (2.6 Linux Kernel) ~
   ~ 4 . Exit ~
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   Enter your Choice (1/2/3/4):  2
   Lun  Persistence utility Installed successfully


   INSTALL QLOGIC DRIVER IN FAILOVER MODE,AND FOLLOW THE INSTRUCTIONS IN
   LUN MIGRATION & PERSISTENCE UTILITY APPLICATION NOTES FOR MIGRATION AND
   ARRAY UPGRADE PROCESS.
   ```
5. Install the Qlogic driver in failover mode.

   To know more about QLogic driver installation, see the install notes Qlogic driver installation that came with your QLogic drive kit.
6. Next, you need to configure the HP storage devices for persistence.

   See Configuring HP storage devices for 2.4 kernels for details.

NOTE:

Installing the `hpdevlabel` utility creates the `/opt/hp/hp-devlabel` directory, where all the scripts needed for migration gets copied. It compiles the sources and puts the binaries and scripts in to the system directories.

All the LUN information for persistence is maintained in the `/etc/sysconfig/hpdevlabel` directory. HP recommends you not to edit this file.

Installing LUN persistence on Linux 2.6 kernels

The `hpudev-cfg` package is used for the LUN persistence on Linux 2.6 kernels. To install the HP LUN persistence utility on your Linux 2.6 kernels, complete the steps below:

1. Log on to your Linux system as a superuser (`root`).
2. Install the `udev` utility, if not already installed.

   To install the `udev` utility, follow the steps below:

   a. Download the `udev-version.tar.gz` file from the following web site:
      http://www.us.kernel.org/pub/linux/utils/kernel/hotplug/

   b. Copy the `udev-version.tar.gz` file into a directory on your system.

   c. Enter the following commands to install the `udev` utility:

      ```
      # tar -zxvf udev-version.tar.gz
      # cd udev-version
      # make
      # make install
      ```

3. Copy the `LMPutils.tar.gz` file into a temporary directory on your system.
4. Enter the following commands to install the `hpudev-cfg` package:

   ```
   # tar -zxvf LMPutils.tar.gz
   # cd ./LMPutils
   # ./install.sh -i
   ```

   Console output:

   ```
   Welcome to the Linux Lun Migration and Lun Persistence installer
       Version 1.1
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   ~ 1 . Lun Migration with Lun Persistency ~
   ~ 2 . Lun Persistency Only (2.4 Linux Kernel) ~
   ~ 3 . Lun Persistency Only (2.6 Linux Kernel) ~
   ~ 4 . Exit ~
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   Enter your Choice (1/2/3/4): 3

   Installing Lun Persistence utility (hpudev-cfg)for 2.6 Kernel
   Please Wait...

   Preparing...      ######################################### [100%]
   1:hpudev-cfg      ######################################### [100%]

     Installation Completed Successfully

   INSTALL QLOGIC DRIVER IN FAILOVER MODE,AND FOLLOW THE INSTRUCTIONS IN
   LUN MIGRATION & PERSISTENCE UTILITY APPLICATION NOTES FOR MIGRATION AND
   ARRAY UPGRADE PROCESS.
   ```

5. Next, you need to configure the HP storage devices for persistence.

   See Configuring HP storage devices for 2.6 kernels for details.

> **NOTE:**
>
> Installing the `hpudev-cfg` package creates the `/opt/hp/hpudev-cfg` directory, where all the necessary scripts needed for persistence are copied. All the LUN information for persistence is maintained in the `.rules` file under the `/etc/udev/rules.d` directory. It creates a rule file `10-HP-Local.rules` under the `/etc/udev/rules.d` directory.
>
> In SUSE9 distributions, the rule file `10-HP-Local.rules` is located under the `/etc/udev/` directory.
>
> You can generate the rule by using the `hp_gen_rules` script. To know more about the `udev` utility, see the udev man pages.

Configuring HP storage devices for 2.4 kernels

This section describes how to add and remove persistence for LUNs in 2.4 kernels by using the `hpdevlabel` utility.

When you use the `hpdevlabel` utility, symbolic links (alias) are created. These links can be:

- Regular aliases that point to a file system partitions on a device
- Raw partitions on the device
- The device itself

Do not access the device through its `/dev/sdX` name; use the symbolic link instead. This is because same links are added after migration.

There is no preferred location to store symbolic links. However, HP recommends that you keep them all in the same location for ease of management.

The following examples show two ways to create symbolic links:

`hpdevlabel add -d /dev/sdb1 -s /dev/`*myalias*

`hpdevlabel add -u UUID -s /dev/`*myalias*

The `hpdevlabel add -s /dev/raw/raw1 -d /dev/sda1` command binds raw device *raw1* to partition 1 on the device `/dev/sda1`. If `sda1` moves on the SCSI bus, `hpdevlabel` updates the `symlink` pointer so that `/dev/raw/raw1` continues to point to the device with `UUID` defined by `/dev/sda1` while it is added to the database file `/etc/sysconfig/hpdevlabel`.

Use the `hpdevlabel remove -s /dev/myalias` command to remove a symbolic link from the database.

> **NOTE:**
>
> Before adding or removing the symbolic link consult your system administrator.

Use the `hpdevlabel status` command to view the current status of all symbolic links. To know more about the `hpdevlabel` command, see the hpdevlabel man pages.

Configuring HP storage devices for 2.6 kernels

This section describes how to add and remove persistence for LUNs in 2.6 kernels by using the `udev` utility, including:

- Creating rules for a device
- Creating links for persistence
- Removing persistence from a device or a LUN

Creating rules for a device

You must create a rule for a LUN to add persistence to that LUN. You need to edit the rules file `/etc/udev/rules.d/10-HP-Local.rules` to create a rule for the LUN.

To create a rule for a LUN, complete the steps below:

1. Generate a rule for a device using the `hp_gen_rules` script that came with the `hpudev-cfg` package.

   For example, generate a rule for the device */sys/block/sda* with *mylink* as the name of the link and enter the following command:

   ```
   # hp_gen_rules sda mylink-sda
   ```
   The following output appears:

   ```
   BUS="scsi", KERNEL="sd*", PROGRAM="scsi_id",
   RESULT="360060e8004274700000002747000000315",
   NAME="%k",SYMLINK="hpdev/mylink
   ```

2. Edit the `/etc/udev/rules.d/10-HP-Local.rules` file by appending the output of step 1 at the end of the file.

> **NOTE:**
>
> In SUSE 9 distributions, the rules file `10-HP-Local.rules` is located under the `/etc/udev/` directory.

Creating links for persistence

You can create a single link or multiple links for persistence.

Creating a single link for persistence:

- To create a single persistence link, enter the following command:

  ```
  # udevstart
  ```
  The links are created under the directory mentioned in the `udev_root path` variable that is configured in the `/etc/udev/udev.conf` file. For example the link shown in step 1 (Creating rules for a device) is created as `$udev_root/hpdev/mylink-sda`.

Creating multiple links for persistence:

- To create multiple links for any device, add space separated names on the corresponding rule in the `/etc/udev/rules.d/10-HP-Local.rules` file.

  Example:

  ```
  BUS="scsi", KERNEL="sd*",
  RESULT="360060e8004274700000002747000000315",
  NAME="%k",SYMLINK="hpdev/mylink-sda hpdev/myanotherlink-sda"
  ```

Removing persistence from a device or a LUN

To removing persistence from a device or a LUN, you must remove the corresponding rule in the `/etc/udev/rules.d/10-HP-Local.rules` file.

To remove the persistence from a device or a LUN, complete the steps below:

1. Delete the corresponding link from the `$udev_root` directory.

   For example, delete the link `$udev_root/hpdev/mylink-sda`

2. Delete the corresponding rule from the `/etc/udev/rules.d/10-HP-Local.rules` file.

3. Enter the following command to update the persistence links of devices or LUNs:

   ```
   # udevstart
   ```

Data-In-Place (DIP) migration procedure for Linux hosts

This section provides information about the Linux host migration procedure for:

- EVA3000/5000 Active-Passive disk arrays to EVA3000/5000 Active-Active disk arrays
- EVA3000/5000 Active-Passive disk arrays to EVA4000/6000/8000 Active-Active disk arrays
- EVA3000/5000 Active-Active disk arrays to EVA4000/6000/8000 Active-Active disk arrays

The migration procedure is same for all the specified arrays. For hardware and firmware upgrade, see the array upgrade guide.

NOTE:

Upgrading of EVA3000/5000 Active-Passive arrays to EVA3000/5000 Active-Active arrays and EVA3000/5000 arrays to EVA4000/6000/8000 arrays must only be performed by a HP service-trained personnel.

Before upgrading EVA3000/5000 arrays to EVA4000/6000/8000 arrays, make sure the EVA firmware version is VCS 3.028 or VCS 4.001. Contact your HP-authorized service representative for assistance in upgrading from any version prior to 3.028.

This section describes the following:

- Prerequisite and required documentation
- Supported hardware and software for array upgrade
- Installing the LUN migration and persistence utility for array upgrade on Linux 2.4 kernels
- Installing LUN migration and persistence utility only for persistency on Linux 2.4 kernels
- Installing LUN migration and persistence utility only for persistency on Linux 2.6 kernels

Prerequisite and required documentation

You must perform the following tasks before migrating and upgrading to Active-Active disk arrays:

1. Stop all Input-Output (I/O) to the storage system.
2. Login to your Linux system as a super user (`root`).

You must also have the following documents ready before starting the upgrade:

1. *HP StorageWorks 4000/6000/8000 Enterprise Virtual Array Connectivity 5.0C for Linux release notes*
2. *HP StorageWorks Enterprise Virtual Array impact assessment checklist for upgrading from an EVA3000/5000 to an EVA4000/6000/8000*
3. *HP StorageWorks Enterprise Virtual Array upgrading an EVA 3000/5000 to an EVA4000/6000/8000 for any hardware changes*

NOTE:

Verify the impact of the VCS 4.001, VCS 5.031, or VCS 5.100 upgrade on your Linux hosts, before proceeding further with the migration.

Supported hardware and software for array upgrade

Table 3 lists the supported hardware and software for LUN migration and persistency for array upgrade on Linux 2.4 kernels.

Table 3 Supported hardware and software on Linux 2.4 kernels

Host feature	Requirement
Operating systems	Red Hat Enterprise Linux 2.1 U7-smp ia32/ia64/ Red Hat Enterprise Linux 2.1 U7-enterprise ia32 Red Hat Enterprise Linux 3.0 U5-hughmem ia32/ia64/ Red Hat Enterprise Linux 3.0 U5-smp ia32 Red Hat Enterprise Linux 3.0 U6-hughmem ia32 Red Hat Enterprise Linux 3.0 U6-smp ia32/ia64/ Red Hat Enterprise Linux 3.0 U7-smp ia32 Red Hat Enterprise Linux 3.0 U7-hughmem ia32/ia64/ SUSE Linux Enterprise Server 8 UL 1.0 SP4 ia32/ia64/
RAID systems	**Migration kit (Secure Path to Qlogic): 2.4 kernels only** EVA3000/5000 (fw rev 3.028)
Host Bus Adapters (HBAs)	FCA2214/FCA2214DC 2-Gb PCI-X A6826A (Driver 7.07.03-5 or later)

Table 4 lists the supported hardware and software for only LUN persistence utility for array upgrade on Linux 2.4 and 2.6 kernels.

Table 4 Supported hardware and software on Linux 2.6 kernels

Package and kernels version	Host feature	Requirement
`hpdevlabel` Linux kernels 2.4	Operating system	Red Hat Enterprise Linux 2.1 U7-smp ia32/ia64/x86_64 Red Hat Enterprise Linux 2.1 U7-enterprise ia32 Red Hat Enterprise Linux 3.0 U7-hughmem ia32/ia64/x86_64 Red Hat Enterprise Linux 3.0 U7-smp ia32 Red Hat Enterprise Linux 3.0 U6-hughmem ia32 Red Hat Enterprise Linux 3.0 U6-smp ia32/ia64/x86_64 Red Hat Enterprise Linux 3.0 U5-hughmem ia32/ia64/x86_64 Red Hat Enterprise Linux 3.0 U5-smp ia32 SUSE Linux Enterprise Server 8 UL 1.0 SP4 ia32/ia64/x86_64
	RAID systems	**LUN persistence kit (Qlogic-FO only):** EVA3000/5000 3.x and 4.x EVA4000/6000/8000 VA7100/7110/7400/7410 XP128/1024/12000
`hpdevlabel` Linux kernels 2.4 and `hpudev-cfg` Linux kernels 2.6	HBAs	FCA2214/FCA2214DC 2-Gb PCI-X and A6826A Driver 7.07.03-5 or later for 2.4 kernels Driver 8.01.03-05 or later for 2.6 kernels
`hpudev-cfg` Linux kernels 2.6	Operating system	Red Hat Enterprise Linux 4 U2 ia32/ia64/x86_64 Red Hat Enterprise Linux4 U3 ia32/ia64/x86_64 SUSE Linux Enterprise Server 9 SP2 ia32/ia64/x86_64 SUSE Linux Enterprise Server 9 SP3 ia32/ia64/x86_64
	RAID systems	**LUN persistence kit (Qlogic-FO only):** EVA3000/5000 3.x and 4.x EVA4000/6000/8000 VA7100/7110/7400/7410 XP128/1024/12000

Installing the LUN migration and persistence utility for array upgrade on Linux 2.4 kernels

This section describes the pre array upgrade steps, the migration procedure, and the post array upgrade steps that you need to follow, including:

• Preparing for array upgrade
• Migration procedure

Preparing for array upgrade

Before upgrading to Active-Active array, you must perform the following steps:

1. Download the LUN migration and persistence utility 1.1 for Linux. Also see Prerequisite and required documentation.

> **NOTE:**
>
> You can download the LUN migration and persistence utilities 1.1 for Linux at
> http://h18006.www1.hp.com/products/sanworks/softwaredrivers/securepath/linuxutilities.html

2. Copy the `LMPutils.tar.gz` file into a temporary directory on your system.
3. Extract the `hpdevlabel` package by entering the following command:

   `# tar -zxvf LMPutils.tar.gz`
4. Run the `install.sh` script by entering the following commands:

   `.cd ./LMPutils`

   `# ./install.sh –i`

   Console output:

```
Welcome to the Linux Lun Migration and Lun Persistence installer
Version 1.1
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
~ 1 . Lun Migration with Lun Persistency  ~
~ 2 . Lun Persistency Only (2.4 Linux Kernel)  ~
~ 3 . Lun Persistency Only (2.6 Linux Kernel)  ~
~ 4 . Exit ~
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Enter your Choice (1/2/3/4) : 1

Lun Migration and Persistence utility Installed successfully

INSTALL QLOGIC DRIVER IN FAILOVER MODE,AND FOLLOW THE INSTRUCTIONS IN LUN
MIGRATION & PERSISTENCE UTILITY APPLICATION NOTES FOR MIGRATION AND
ARRAY UPGRADE PROCESS.
```

Migration procedure

If your Linux host is running Secure Path and you want to migrate to Active-Active array and want to have the persistence for the LUNs from Active-Active array, complete the steps below:

> **NOTE:**
>
> The installation does not remove the Secure Path.

1. Complete the pre-installation procedure (Preparing for array upgrade).
2. Make a list of all the arrays connected to your Linux host that you want to upgrade.
3. Run the `# /opt/hp/hp-devlabel/premigration.sh` command.
4. Install the Qlogic driver supported by VCS 4.001, VCS 5.031, or VCS 5.100 in failover mode.
5. Configure `qlogic` in excludemodel mode for coexistence of Active-Passive and Active-Active array.

   The variable `ql2xexcludemodel` in the `/etc/modprobe.conf` file excludes the device models from being a failover capable target. Combine one or more of the following model numbers into an exclusion mask:

   ```
   0x20 - HSV111, HSV101
   0x04 - HSV110, HSV100
   ```

These values are configured in the `/etc/modprobe.conf` file. For more details, see the install notes for Qlogic driver.

6. Shut down all Linux host that are booting from the selected storage system.
7. Upgrade the selected arrays now.

📝 NOTE:

See the documentation listed in Prerequisite and required documentation for array firmware upgrade.

8. Run the `/opt/hp/hp_fibreutils/pbl/ pbl_inst.sh -i` command after the successful upgrade of the arrays.

📝 IMPORTANT:

Run this command only once on the host.

9. Reboot the system and follow the migration guide.
10. Run the following command to display the mapping of symbolic links to the kernels named devices:

    `# hpdevlabel status`

📝 NOTE:

Repeat steps 2–10 to upgrade the remaining EVA Active-Passive arrays connected to the host.

📝 NOTE:

Persistency for all the migrated LUNs from the upgraded arrays is done automatically.

Installing LUN migration and persistence utility only for persistency on Linux 2.4 kernels

This section describes the pre array upgrade steps, the migration procedure, and the post array upgrade steps that needs to be followed for installing the LUN migration and persistence utility and for array upgrade, only for persistency on Linux 2.4 kernels, including:

*   Preparing for array upgrade
*   Upgrade procedure

Preparing for array upgrade

Before upgrading to Active-Active array, you must perform the following steps:

1. Download the LUN migration and persistence utility 1.1 for Linux. Also see Prerequisite and required documentation.

📝 NOTE:

You can download the LUN migration and persistence utilities 1.1 for Linux at
http://h18006.www1.hp.com/products/sanworks/softwaredrivers/securepath/linuxutilities.html

2. Copy the `LMPutils.tar.gz` file into a temporary directory on your system.

3. Extract the `hpdevlabel` package by entering the following command:

```
# tar -zxvf LMPutils.tar.gz
```

4. Run the `install.sh` script by entering the following commands:

```
.cd ./LMPutils
# ./install.sh –i
```

Console output:

```
Welcome to the Linux Lun Migration and Lun Persistence installer
          Version 1.1
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
~ 1 . Lun Migration with Lun Persistency ~
~ 2 . Lun Persistency Only (2.4 Linux Kernel) ~
~ 3 . Lun Persistency Only (2.6 Linux Kernel) ~
~ 4 . Exit ~
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Enter your Choice (1/2/3/4) : 2

Lun Persistence utility Installed successfully

INSTALL QLOGIC DRIVER IN FAILOVER MODE,AND FOLLOW THE INSTRUCTIONS IN
LUN MIGRATION & PERSISTENCE UTILITY APPLICATION NOTES FOR MIGRATION AND
ARRAY UPGRADE PROCESS.
```

Upgrade procedure

If you are using `LMPutils1.0` for persistency and only want to upgrade the arrays, first upgrade `LMPutils1.0` to `LMPutils1.1` and then complete the steps below:

📝 **NOTE:**

If you are using `LMPutils` for the first time, or you want to add a new LUNs for persistency, perform the following:

- Run the command `hpdevlabel add –d` to add LUN information into the LMPUtility database.
- Follow steps 2–10 to upgrade the Linux host.

1. Complete the pre-installation procedure (Preparing for array upgrade).
2. Make a list of all the arrays connected to your Linux host that you want to upgraded.
3. Install the Qlogic driver supported by VCS 4.001, VCS 5.031, and VCS 5.100 in failover mode.
4. Configure `qlogic` in excludemodel mode for coexistence of Active-Passive and Active-Active arrays.

    The variable `ql2xexcludemodel` in the `/etc/modprobe.conf` file excludes the device models from being a failover capable target. Combine one or more of the following model numbers into an exclusion mask:

    ```
    0x20 - HSV111, HSV101
    0x04 - HSV110, HSV100
    ```

📝 **NOTE:**

These values are configured in the `/etc/modprobe.conf` file. For more details, see the install notes for Qlogic driver.

5. Run the `/opt/hp/hp-devlabel/preupgrade.sh` command after the successful upgrade of the arrays.

Console output:

```
Welcome to the Migration Process
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
~   1 . Migrate EVA3000/5000 Active-Passive to EVA3000/5000 Active-Active   ~
~   2 . Migrate EVA3000/5000 Active-Passive to EVA4000/6000/8000            ~
~   3 . Migrate EVA3000/5000 Active-Active  to EVA4000/6000/8000            ~
~   4 . Exit                                                                ~
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Enter your Choice (1/2/3/4) :
```

6. Follow the on-screen instructions.
7. Shut down any Linux host booting from the selected storage system.
8. Upgrade the selected arrays now.

NOTE:

See the documentation listed in Prerequisite and required documentation for array firmware upgrade.

9. Run the `/opt/hp/hp_fibreutils/pbl/pbl_inst.sh –i` command after the successful upgrade of the arrays.

IMPORTANT:

Run this command only once on the host.

10. Reboot the system.
11. Run the following command to display the status of devices:

    ```
    # hpdevlabel status
    ```

NOTE:

Repeat steps 5–10 to upgrade the remaining EVA arrays connected to the host.

Installing LUN migration and persistence utility only for persistency on Linux 2.6 kernels

This section describes the pre array upgrade steps, the migration procedure, and the post array upgrade steps that needs to be followed for installing the LUN migration and persistence utility and for array upgrade, only for persistency on Linux 2.6 kernels, including:

- Preparing for array upgrade
- Upgrade procedure

Preparing for array upgrade

Before upgrading to Active-Active array, you must perform the following steps:

1. Download the LUN migration and persistence utility 1.1 for Linux. Also see Prerequisite and required documentation.

> **NOTE:**
>
> You can download the LUN migration and persistence utilities 1.1 for Linux at
> http://h18006.www1.hp.com/products/sanworks/softwaredrivers/securepath/linuxutilities.html

2. Copy the `LMPutils.tar.gz` file into a temporary directory on your system.
3. Extract the `hpdevlabel` package by entering the following command:

   `# tar -zxvf LMPutils.tar.gz`
4. Run the `install.sh` script by entering the following commands:

   `.cd ./LMPutils`

   `# ./install.sh -i`

   Console output:

```
Welcome to the Linux Lun Migration and Lun Persistence installer
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
~ 1 . Lun Migration with Lun Persistency ~
~ 2 . Lun Persistency Only (2.4 Linux Kernel) ~
~ 3 . Lun Persistency Only (2.6 Linux Kernel) ~
~ 4 . Exit ~
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Enter your Choice (1/2/3/4): 3

Installing Lun Persistence utility (hpudev-cfg) for 2.6 Kernel Please Wait...

Preparing...    ######################################### [100%]
1:hpudev-cfg    ######################################### [100%]

INSTALL QLOGIC DRIVER IN FAILOVER MODE,AND FOLLOW THE INSTRUCTIONS IN
LUN MIGRATION & PERSISTENCE UTILITY APPLICATION NOTES FOR MIGRATION AND
ARRAY UPGRADE PROCESS.
```

Upgrade procedure

To install only the LUN persistence on Linux 2.6 kernels, complete the steps below:

1. Complete the pre-installation procedure (Preparing for array upgrade).
2. Install the Qlogic driver supported by VCS 4.001, VCS 5.031, or VCS 5.100 in failover mode. See the install notes for Qlogic driver installation for details.
3. Install the latest `fibreutils` utility that came with your HP Qlogic driver kit.
4. Shut down any Linux host booting from the selected storage system.
5. Upgrade the selected arrays now.

NOTE:
See the documentation listed in Prerequisite and required documentation for array firmware upgrade.

6. Reboot the system.

Removing the migration and persistence utility

To remove the HP LUN persistence utility for Linux 2.4 kernels or Linux 2.6 kernels:

Execute the following commands:

```
#cd ./LMPutils
# install.sh  -u
```

IMPORTANT:
The database containing the LUN persistency gets removed at the time of removing the migration and persistence utility.

Troubleshooting

You can get an error message similar to the following while adding persistency for device partitions:

```
Uniqueness check failed. The following devices have the same UUID:
/dev/sdX1
/dev/sdX2
Failure.
The device UUID for /dev/sdX1 is identical to other devices on your system.Because of this, you can
```

If you get such an error, determine if the `partx` utility (which comes with the `util-linux` package) is installed, by entering the following command:

```
# rpm -ql util-linux | grep partx
```

If `partx` is not installed, follow the steps below:

1. Copy the `util-linux` source rpm package from the Linux installation CD-ROM.
2. Install the `util-linux` source rpm package by entering the following command:
   ```
   # rpm -ivh util-linux-version-src.rpm
   ```
3. Build the `util-linux` source rpm by entering one of the following commands:
   - For Redhat:
     ```
     # cd /usr/src/redhat/SPECS
     ```
   - For SUSE:

```
# cd /usr/src/package/SPECS
```
4. Finish building the `util-linux` source rpm by entering the following command:
```
# rpmbuild -bb util-linux.spec
```
5. Build the `partx` utility by entering one of the following commands:
   - For Redhat:
     ```
     # cd /usr/src/redhat/BUILD/ util-linux-version/partx
     ```
   - For SUSE:
     ```
     # cd /usr/src/package/BUILD/util-linux-version/partx
     ```
   - For all:
     ```
     # make all
     ```
6. Copy `partx`, `addpart`, and `delpart` into the `/usr/bin/` directory.

Limitations of the LUN migration and persistence utilities

This section describes the limitations of the LUN migration and persistence utilities for Linux 2.4 and 2.6 kernels, including:

- Limitations for Linux 2.4 kernels using the hpdevlabel utility
- Limitations for Linux 2.6 kernels using the udev utility

Limitations for Linux 2.4 kernels using the hpdevlabel utility

The following are limitations for Linux 2.4 kernels using the `hpdevlabel` utility:

- The HP LUN persistence utility is not qualified with the Logical Volume Manager (LVM).
- The HP LUN persistence utility does not provide an automated way to create persistency for multiple devices at once. Persistency for each device is created individually by entering the following command:
  ```
  # hpdevlabel add
  ```
- The HP LUN persistence utility does not provide persistency during system BIOS and Boot Loader startup. This is because the root file system must be mounted for the HP LUN persistence utility scripts to execute.

  Ensure that the system always finds the kernels root file system and boot files.
- Changes in the SAN require a reload of the QLogic driver to establish the changes. Use the `hp_devlabel restart` command to update various symbolic links.

Limitations for Linux 2.6 kernels using the udev utility

The following are limitations for Linux 2.6 kernels using the `udev` utility:

- The `udev` utility is not qualified with the Logical Volume Manager (LVM) and device partition usage.
- The `udev` utility does not provide persistency during system BIOS and Boot Loader startup. This is because the root file system must be mounted for the `udev` utility scripts to execute.

  Ensure that the system always finds the kernels root file system and boot files.
- The LUN Migration and Persistence Utility (`LMPutils`) does not support partition, as `udev` returns the same name for both device and its partitions.